CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 97 - 077
SITE CLEANUP REQUIREMENTS AND RESCISSION OF ORDER 91 - 094 FOR

EXXON COMPANY, U.S.A.,
3400 EAST SECOND ST.,
CITY OF BENICIA
SOLANO COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. Named Discharger. Exxon Company U.S.A., (hereinafter called the Discharger), owns and operates the petroleum refinery, (hereinafter called the facility).

2. Facility Location. The facility is located in the City of Benicia, Solano County and generally lies between highways 680 and 780, The facility is less than half a mile from Suisun Bay. It is bounded to the north by East Second Street and to the east by Sulphur Spring Creek.

3. Facility Operation The Facility, which began operation in 1969, manufactures hydrocarbon products, byproducts and intermediaries and is classified as a cracking refinery as defined by U.S Environmental Protection Agency pursuant to 40 CFR 419.20. Approximate daily crude throughput consists of about 135,000 barrels of oil per day.

4. Purpose of Order. The Order is based upon preliminary findings obtained from investigations at the site or spill reports which indicate that further investigation aimed at remedial or corrective action are required. This Order identifies specific areas of concern and establishes time schedules for workplans to identify remedial activities and requires that the necessary activities be initiated. In addition, the Order requires submission of proposed water quality objectives.

5. Facility Description. Exxon Refinery is defined by four operational sites (figure 1). Each operational site has been subdivided into smaller areas to be used for evaluating and remediating potentially contaminated areas. The operating sites and areas referred to in this Order are identified below:

Operational Sites	Functional Areas
The crude oil storage (COSA)	Area 6
The wastewater treatment plant site (WWTP)	Area 1

The main Refinery site.	Areas 2, 3,4,5,7,8,9,10,11,12.
Highpoint and Old Dock Pipeline Area	Area 13

(Portions of Area 2 are located in Exxon Marketing Terminal)

6. Release Locations. Releases of contaminants have been reported in some areas as a result of site investigations, staff observations and construction. The location maps of these areas are shown in figures 2 and 4, and include:

   a. WWTP, Area 1 (figure 2 and 3)
   b. Slop Oil, Area 4 (figure 2 and 7)
   c. Intermediates Storage Area 5 (figure 2 and 7)
   d. Diesel Salt Dryer area (5 & 9) (figure 2)
   e. Light Ends Storage Area (7) (figure 2 and 7)
   f. Lower Level Storage Area 8 (figure 2 and 8)
   g. Pipestill section within Process block area 9 (figure 2)
   h. Highpoint and Old Dock Pipeline Area 13 (figure 4, 5 and 6)

7. General Refinery Geology. According to the report 1 (see attached table of references), the Refinery over lies the Mesozoic - age sedimentary and igneous rocks of the Franciscan assemblage, which have been deformed by a series of folding and faulting.

AREA 1 (WWTP PLANT)

8. Site History (WWTP - Area 1). Area 1 is located in a former marshland reclaimed in the 1960s by placement of fill material. Four ponds, (the equalization, retention, 20 year and final ponds) lie in the eastern portion of Area 1 as shown in figure 3. Other equipment including the Biox unit and Primary treatment units are also placed in Area 1. The area is underlain by silty clay material containing gravel, sand and roots. Piezometric surface of groundwater in the area ranges from above groundsurface to 8.5 feet below ground surface.

9. Impact, Investigation & Remedial Actions, Area 1 : Soil and groundwater samples from monitoring wells installed in the vicinity of Area 1 have been analyzed for contaminants and the results, documented in three technical reports 1, 2, 6 (see attached table of references), confirm a hydrocarbon impact. This order addresses the release in the vicinity of well 101 and other wells excepting wells directly adjacent to the ponds, which is addressed in waste discharge requirement Order No. 94 - 070. Aquatic short term chronic mortality bioassays on mysid shrimp were conducted using groundwater samples from wells 101, 117, 125, 126, 127 and 128. All exhibited some degree of chronic toxicity. This report indicates that this may be due to ammonia in the sample. The highest toxicity was observed in samples from well 117 located at about 400 feet from the Exxon waste water treatment ponds.

AREA 13 (Highpoint Pipeline & Old Dock Pipeline)

10. Site description - Figures 4 through 6 are general and detail map of Area 13 which consist of Highpoint Pipeline and Old Dock Pipeline sections. The Highpoint pipeline section consists of a 50 feet wide and 5000 feet long Exxon pipeline right of way, extending from the southwest portion of Area 6 to Highway 780. The highpoint pipeline is connected to Exxon's crude supply line which runs through to the marine terminal dock on Carquinez Strait. The Old Dock pipeline section, which is not in use, is connected to the highpoint pipeline south of highway 780 and runs to another dock area west of the marine terminal dock.

11. Impact / Remedial Actions, - No records of release were found in the reports but indications of hydrocarbon impact in soil ranging upto 1300 ppm of gasoline and 2800 ppm of diesel have been documented in the previous investigation report (see attached table of reference 4.)

AREA 4 (Slop Oil)

12. Site Description: Figure 7 is a plan map showing Areas 4, 5 and 7 which form the Upper Storage Area located in the southern portion of the main refinery. Slop Oil Area 4 covers about 12 acres of land located in a former hillside and ravine which has been cut and filled respectively. The area is bounded to the north,east, south and west by the refinery's 2nd Street, Avenue E, Avenue B and the rail road track respectively. The area contains about 7 aboveground storage tanks and a slop oil transfer pad. Groundwater occur at about 13 feet below ground surface.

13. Impact, Investigation & Remedial Actions, - Releases have been documented in the past in Area 4. Results of soil and groundwater investigations documented in the report 7 (see attached table of references), confirm the hydrocarbon impacts. Constituents identified include gasoline, diesel and volatile organics. Soil hydrocarbon contaminants were mostly found in native soil at depths ranging from 24 feet to 39 feet bgs. Persistent detections are found in wells 405 and 406 that are screened in native soil and are close to sewer lines. Soil and groundwater impacts in deep sections of the borings suggest underground releases from sources such as pipe lines and sewer lines or migration of contaminants.

AREA 5 - Intermediate Storage Area (ISA)

14. Site Description:. Figure 7 is showing a plan map of Areas 4, 5 and 7 which form the Upper Storage Area located in the southern portion of the main refinery. Area 5 covers about 30 acres of land located in a former hillside with ravines which has been cut and filled respectively. The present topography consists of elevated flat surfaces (54 feet msl) with built up earth dikes for tank secondary containment. The eastern and southern boundary of the area is marked by a steep slope falling 40 feet from the elevated flat surface to a lower level section. The entire area is bounded to the north,

east, south and west by refinery's 6th Street, Avenue A / Sulphur Spring Creek, Avenue H, and Avenue E respectively. The area contains about 14 aboveground storage tanks, pipeline alleys and refinery sewer lines. Groundwater occurs at about 8.5 feet bgs

15. Impact / Remedial Actions, (ISA - Area 5) - Releases have been documented in the past. Results of soil and groundwater investigations documented in the reports 6&7 (see attached table of references), confirm that hydrocarbon releases and impacts have occurred in the area. Constituents identified include gasoline, diesel, jet fuel, volatile and semi - volatile organics, and free phase product. Migration is evident along avenue 'A' where seeps at the toe of the slope and groundwater contamination in wells very close to the Creek have been documented. The extent of impact in this area requires the implementation of targeted hot spot remedial action as well as downgradient migration control between wells 329 and B -19 along avenue 'A'

AREA 7 - Light Ends Storage Area (LESA)

16. Site Description: Figure 7 is a plan map of Areas 4, 5 and 7 which form the Upper Level Storage Area located in the southern portion of the main refinery. The Area 7 covers about 33.5 acres of land located in a former hillside with ravines that have been cut and filled respectively. Area 7 is bounded to the north, east, south and west by the refinery's 5th Street, Avenue E, 2nd Street, and the railroad track respectively. The area contains about 9 aboveground storage tanks including two new tanks. Groundwater occurs at about 2 feet to 13 feet below groundsurface.

17. Impact / Remedial Actions, - Results of soil and groundwater investigations documented in reports 7 and 6 (see attached table of references), indicate that hydrocarbon releases have occurred in the area. Constituents indicated include gasoline, diesel, volatile and semi - volatile organics. The relative absence of soil impact in the vicinity of and indications of groundwater impact in wells 711, 719 and 405 suggests that contaminant migration through groundwater occurs in the area. Since migration control measures will be required along Avenue A, the extent of impact in this area will require the implementation of only targeted remediation at known hot spot sections. Further investigation will be required to define potential impacts in the vicinity of tank farm housing tanks 1756, 1755, 1752 and 1751 due to confirmed soil impact in some sections.

AREA 8 - Lower level Storage Area (LLSA)

18. Site Description. Figure 8 is a plan map of the "Lower Level Storage Area" which is located along the eastern portion of the main refinery and covers about 65 acres of land. The area is bounded by 15th Street to the north, 6th Street to south, Avenue A to the east and Avenue D to the west. Except for the raised embankments for the secondary containment of tanks, the LLSA has a relatively flat terrain. The area houses about 17 large storage tanks containing various refined products and a blending

facility. Groundwater occurs at about 5 feet to 13 feet below groundsurface.

19. Impact / Remedial Actions - Results of soil and groundwater investigations documented in reports 5, 6 (see attached table of references) indicate that significant hydrocarbon releases have occurred in the area. Constituents indicated include free phase hydrocarbon, gasoline, diesel, volatile (BTEX) and semi - volatile organics. The extent of impact in this area requires the implementation of targeted hot spot remedial action in the vicinity of 9th Street, the blending facility, tanks 1711, 1734, 1736, 1735 as well as migration control along Avenue A, which is threatening the Sulphur Spring Creek. Further characterization will be conducted in the vicinity of borings 804, 812, 813 and tank 1713.

GENERAL FINDINGS

20. Regulatory Status. The Board has adopted the following Orders for this site:

- o Waste Discharge Requirement (Order No. 91 - 094) adopted June 19, 1991.
- o Waste Discharge Requirement (Order No. 94 - 070) adopted June 15, 1994.
- o NPDES Permit (Order No. 96 - 068) adopted May 15, 1996.

21. This Order rescinds Order 91 -094.

22. Basin Plan. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20 and November 13, respectively, of 1995. A summary of regulatory provisions is contained in Title 23 of the California Code of Regulations at Section 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

23. State Water Board Policies.

a. State Water Board Resolution No. 68 - 16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality can not be restored. Non - background cleanup levels must be consistent with the maximum benefit to the people of the state, not unreasonably affect present and anticipated beneficial uses of such water and not result in exceedence of applicable water quality objectives.

b. State Water Board Resolution No. 92 - 49, "Policies and Procedures for Investigation and cleanup and Abatement of Discharges Under Water Code

Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92 - 49, as amended.

24. Other Board Policies.

a. Board Resolution No. 88 -160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.

b. Board Resolution No. 89 - 39, Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the Region, with limited exceptions for areas of high TDS, low yield, or naturally high contaminant levels.

25. Beneficial Uses.

a. Surface Waters. The existing and potential beneficial uses of the Suisun Bay, Carquinez Strait, Beaver Creek and Sulphur Spring Creek are:

(1) Industrial Process and Service Supply;
(2) Navigation;
(3) Water Contact Recreation;
(4) Non-Contact Recreation;
(5) Ocean Commercial and Sport Fishing;
(6) Wildlife Habitat;
(7) Preservation of Rare and Endangered Species;
(8) Fish Migration and Spawning;
(9) Shellfish Harvesting, and;
(10) Estuarine Habitat.

b. Ground Waters. The Discharger indicates that groundwater at the site is not utilized for drinking water purposes. However groundwater uses within one mile of the facility was not fully defined in the reports. The potential beneficial uses of groundwater in the vicinity of the Refinery areas are:

i. Industrial and domestic water supply for both deep and shallow aquifers in areas 3 through 13 of the refinery and;

ii. Industrial service and agricultural supply for ground water in the Waste Water Treatment Area 1.

26. Chemicals of Concern. Soil and ground water contaminants consist of total petroleum hydrocarbons as gasoline, diesel, jet fuel, kerosene, and total oil and grease, benzene, toluene, ethylbenzene, xylene, other volatile and semi-volatile organic compounds.

Most metals except for silver, molybdenum and thallium, were detected in soil or groundwater. Due to high ambient levels of metals in soil and groundwater further studies will be needed to determine if significant impact has occurred. Bioassay tests from Area 1 indicated groundwater toxicity to aquatic life.

27. Reference to Regulations. References to Chapter 15 are to Division 3, Title 23 of the California Code of Regulations. Chapter 15 applies to waste management units but are only used as a guideline in this document.

28. Cost Recovery. Pursuant to the California Water Code Section 13304, the discharger is hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.

29. California Environmental Quality Act. This action is an Order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321, of the Resources Agency Guidelines,Title 14 of the California Code of Regulations.

30. Notification. The Board has notified the discharger and all interested agencies and persons of its intent under the California Water Code Section 13304 to prescribe the site cleanup requirements for the discharge and has provided them with the opportunity to submit their written comments.

31. Public Hearing. The Board, at a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger (or its agents, successors or assigns), shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State of California is prohibited.

2. Further significant migration of pollutants, waste or hazardous waste through subsurface transport to waters of the State of California is prohibited. Significant migration shall be deemed to occur if:

   a. Constituent concentrations exceed or equals established water quality goals / standards at points of compliance.

b. If the Executive Officer or Exxon determines that Exxon has caused further migration of contaminants at existing discharge areas or currently applied discharge.

3. Activities, associated with the subsurface investigation and site cleanup, that cause significant adverse migration of pollutants or hazardous waste are prohibited, except as approved by the Executive Officer.

B. SPECIFICATIONS

The Discharger shall abide by the following specifications:

1. **Good Operation and Maintenance (O&M)**: The discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.

2. **Groundwater Reuse**: If groundwater extraction and treatment is considered as part of remedial activity, the feasibility of water reuse, reinjection, and disposal to the sanitary sewer must be evaluated. Based on the Regional Board Resolution 88-160, the discharger shall optimize, with a goal of 100%, the reclamation or reuse of ground water extracted. If reuse or reinjection is part of a proposed alternative, an application for Site Cleanup Requirements may be required. If discharge to waters of the State is part of a proposed alternative, an application for an NPDES permit must be completed and submitted, and must include the evaluation of the feasibility of water reuse, reinjection, and disposal to the sanitary sewer, if ground water quality standards are exceeded.

3. **Water Quality Goals / Standards:** The discharger shall propose water quality standards, goals and compliance points for approval by the Executive Officer, according to the requirements of this Order, for the following parameters and substance groups:

   Total petroleum hydrocarbons as gasoline;
   Total petroleum hydrocarbons as diesel;
   Methyl Tertiary Butyl Ether;
   Total Recoverable Petroleum Hydrocarbon , proposal shall be due following at least four quarterly monitoring periods;
   Volatile and semi - Volatile Organic Compounds and;
   pH.

C. TASKS & SCHEDULES

1. The discharger shall comply with the tasks, schedules, specifications and provisions of this Order, in accordance with the time schedule and tasks set here in.

2. **Slop Oil Area 4.** Further assessment / investigation shall be required to evaluate the extent and source of contamination described in the findings of this Order. The investigation shall be focused in the vicinity of Wells 405 and 406, Tanks 1752 and 1756, and sewer lines. Additionally, for more effective downgradient monitoring of shallow groundwater, Exxon shall consider adjusting screens on Wells B2, B4, 403 and 404 to shallow depth. Following the review of the investigation report, the Executive Officer shall determine if remedial action is needed and if so, Exxon shall evaluate appropriate remedial actions. The discharger shall document all phases of work and shall submit technical and construction reports as follows:

   a. Exxon shall submit an assessment / investigation workplan acceptable to the Executive Officer.

      Investigation Workplan Report Due: No later than January 20, 1998.

   b. Exxon shall submit a report on the assessment and results of the investigation including an evaluation of current or potential threat of impacts to groundwater and surface water quality. The report shall evaluate the effectiveness of the existing monitoring network including detailed recommendations for screen length adjustment, other modifications, abandonment of existing wells and/or addition of new wells. The report shall include recommendations (if needed) for further investigation, monitoring network adjustment and / or remedial actions .

      Assessment / Investigation Report Due: No later than August 21, 1998.

   c. If required by the Executive Officer pursuant to paragraph 2.b. above, Exxon shall submit any or all reports below as acceptable to the Executive Officer and at specified due dates as follows:

      (1) Report of evaluation of remedial actions. The report shall include a consideration of various remedial alternatives for migration control and concentration reduction. The report shall recommend a remedial alternative with conceptual design and a schedule of implementation;
      (2) Report documenting changes to the monitoring network and ;
      (3) Workplan for additional Investigation.

3. **Intermediate Storage Area 5 and Lower level storage Area 8**. While further investigations may be necessary due to the complexity and large area involved, a couple of highly impacted locations have been identified. Remedial activity is required at these locations to stem migration toward the creek and reduce

contaminant concentration levels at the impacted sections. The discharger shall document all phases of work and shall submit technical and construction reports as follows:

a. The discharger shall prepare a workplan for investigation and a report of the investigation, and then a report of evaluation of remedial actions at the potentially impacted portion mostly located in the elevated flat section. The investigation shall seek to define the level, areal and vertical extent of soil and groundwater contaminants. The evaluation of remedial actions report shall include a consideration of various remedial alternatives for concentration reduction. The remedial evaluation report shall propose a remedial alternative with conceptual design and schedule of implementation. The investigations shall consider, but not be limited to, portions in the vicinity of Borings 504, 512, 513, 502, 501, well 505, Borings 804, 812, 813, and Tank 1713. The workplan shall focus the investigation on appropriate areas and provide justification if any areas are excluded. The discharger shall submit these reports as acceptable to the Executive Officer as follows:

Workplan for Investigation Due: No later than September 22, 1997.
Report of Investigation Due: No later than April 17, 1998.

b. The discharger shall implement remedial actions at locations of high impact as well as downgradient migration control. Migration control shall be focused in the areas between Wells 329 and B -19 and between Well B16 and Well B11 along Avenue A. Remedial actions shall be conducted in the vicinity of 9th street, blending facility and tanks 1711, 1734, 1736,1735. For this purpose the discharger shall revise or amend the February 13, 1995 "Conceptual Design Report for the Recovery of Free Phase Hydrocarbon Plan". The revised report shall add dissolved phase hydrocarbon migration and targeted remediation of highly impacted soil / groundwater locations as part of remedial goals. The plan shall include a description of various remedial alternatives, cost estimates, estimates of environmental impact of each alternative and identify recommended alternative. The report shall include a detailed discussion of each alternative's applicability, efficiency and expected results. The discharger shall submit the revised reports as acceptable to the Executive Officer as follows:

The Revised Remedial action plan is due no later than August 14, 1998.

c. For the recommended alternative in Task 3.b above, approved by the Executive Officer, Exxon shall prepare a design and operation plan report. The report shall include at a minimum, a detailed description of

processes, design drawings, specifications and capacities, description of equipment, location and rational for placement, tables of actual cost estimates for the project, a description of performance evaluation method and implementation schedule. All additional investigations for this design must be approved by staff. All phases of the report must be submitted, as acceptable to the Executive Officer, no later than **December 17, 1998.**

d. Exxon shall implement the plan as stated in Task 3.c. and submit a report of certification of construction as acceptable to the Executive Officer. The report shall include the final as built design details and specifications, a description and schedule for post construction maintenance and improvements. In addition the report shall include the results of first performance evaluation, cost estimates for the maintenance and performance evaluation program and a post earthquake inspection and corrective action plan.

Report due no later than September 17, 1999

4. **LESA Area 7:** Further investigations are necessary to define the extent of contamination in portions of the LESA area. Some sections of soil and groundwater impacts have been defined and remedial activity in those sections should be implemented to reduce concentration levels. The discharger shall document all phases of work and shall submit technical and construction reports as follows:

a. The discharger shall prepare a plan and a report of further investigation, and then, if necessary, a report of evaluation of remedial actions at portions of area 7. The investigation shall seek to define the level, areal and vertical extent of soil and groundwater contaminants. The evaluation of remedial actions report shall include a consideration of various remedial alternatives for concentration reduction, recommended remedial alternative with design and schedule of implementation. These portions shall include but not be limited to sections in the vicinity of the tank farm housing tanks 1756,1755, 1752 and 1751. The discharger shall submit these reports as acceptable to the Executive Officer as follows:

Investigation Plan Due: No later than October 21, 1997.
Investigation Report Due: No later than May 20, 1998.
Evaluation of Remedial actions Report Due: If Required

b. The discharger shall implement remedial actions at sections of elevated impact in the vicinity of 3rd Street. For this purpose the discharger shall revise or amend the February 13, 1995 "Conceptual Design Report

for the Recovery of Free Phase Hydrocarbon Plan". The revised remedial plan shall address all details as described in Task 3.b.

The report is due no later than August 14, 1998, as indicated in Task 3.b.

c. For the recommended alternative in Task 4.b. above, approved by the Executive Officer, Exxon shall prepare a design and operation plan report. The report shall address all details as indicated in Task 3.c.

All phases of the report must be submitted no later than December 17, 1998.

d. Exxon shall implement the plan as stated in Task 4.c. above and submit report of certification of construction as acceptable to the Executive Officer. The report shall address all details as indicated in Provision 3.c.

Report Due No later than September 17, 1999.

5. **Remedial Actions (Area 1);** The discharger shall institute remedial action in the vicinity of well 101 and conduct a study (for example toxicity identification evaluation of groundwater in area 1) to determine the cause of the toxicity discussed in Finding 9 of this Order. The discharger shall comply with these requirements and document all phases of work and shall submit technical and construction reports as follows:

a. The discharger shall submit a remedial action plan for cleanup of groundwater impact in the vicinity well 101, as acceptable to the Executive Officer. The plan shall include a detailed description of various remedial alternatives, cost estimates, estimate of environmental impact of each alternative and recommended alternative. The report shall include a detailed discussion of each alternative, applicability, efficiency and expected results. The discharger shall submit the following reports as acceptable to the Executive officer as follows:

Remedial Action Plan, Due: No later than August 14, 1998.
Certification of Construction Report, Report Due: No later than May 1, 1999.

b. The discharger shall prepare a plan (for example toxicity identification evaluation) to determine the cause of the Area 1 groundwater toxicity discussed in Finding 9 of this Order. The plan shall include details of processes and procedures to be used, schedule for submitting a report of the evaluation and implementation.

Report Due: No later than March 17, 1998.

6. **AREA 13 (Pipeline Highpoint / Old Dock Pipeline):** In the past, hydrocarbon soil impact was documented in a limited investigation. Further investigations are necessary to determine the extent of impact in especially the Old Dock Pipeline area. The discharger shall be required to evaluate remedial options and if necessary, as determined by the Executive Officer, implement remedial actions in the area. The discharger shall document all phases of work and shall submit technical and construction reports as follows:

   a. The discharger shall prepare a plan and report of further investigation, and then a report of evaluation of remedial actions at the potentially impacted portion of the area. The investigation shall seek to define the level, areal and vertical extent of soil and groundwater contaminants. Investigation shall include a detail definition of hydrogeology, lithology and properties of groundwater in the area. The discharger shall submit the reports as acceptable to the Executive Officer according to the schedule below:

      Investigation plan Due: No later than October 17, 1998
      Investigation Report Due: No later than May 20, 1998.

   b. If the Executive Officer determines it necessary, Exxon shall prepare an evaluation of remedial action plan as acceptable to the Executive Officer. The remedial action plan shall address all details as described in Task 2.c. The plan due date shall be determined following a review of Task 6.a above

7. **Post Earthquake Inspection and Corrective Action Plan.** The discharger shall submit a detailed Post Earthquake Inspection and Corrective Action Plan for all instruments of remedial activity in place. The plan shall be implemented in the event of any earthquake generating ground shaking of Magnitude 5 or greater on a Richter scale at or near the instruments of remedial activity. The report shall describe the equipment, trenches, ground water monitoring and extraction systems potentially impacted by the static and seismic response of the remedial system. The plan shall provide for preliminary reporting of the post earthquake inspection to the Board within 24 hours of the occurrence of the earthquake. Immediately after an earthquake event causing damage to the remedial system structures, the corrective action plan shall be implemented and this Board shall be notified of any damage.

   Report Due: No later than the due date for submittal of certification of construction report for Task 2.b., 3.d., 4.d, and 5.a.

8. **Ground Water Quality Goal / Protection Standards.** The discharger shall

submit a proposal for water quality standards and goals for all remedial action locations and down gradient boundary sections as acceptable to the Executive Officer. Applicable constituents may include but not be limited to the constituents listed in the 'SPECIFICATIONS' of this Order. The proposal shall include a decision-making procedure for shutting down or resumption of remedial activity if trigger levels are exceeded. The proposal shall include plans to conduct evaluation studies if trigger levels are exceeded and recommend appropriate actions acceptable to the Executive Officer. The proposal for the water quality standards and goals shall be due **no later than December 16, 1998** as follows:

a. Water quality goals shall apply within the facility in areas where remedial activity is taking place or shall be implemented in section where impact is being monitored for possible remedial action. Water quality goals shall be set for but not limited to areas 4,5,7,8 and 13.

b. Water quality protection standards shall be established for the groundwater downgradient boundary areas to protect the existing water quality of surface and groundwater beyond Exxon's operating boundaries. Water quality protection standards shall be set for but not limited to areas 4,5,8 and 13.

9. **Groundwater Monitoring Plan**: Exxon shall propose revised groundwater monitoring plan for the entire Refinery. The plan shall include procedures, frequencies, schedules and list of sampling location for monitoring groundwater: 1) for the chemicals and parameters listed in specification 3 (Water Quality Goals and Standards), 2) for Total Recoverable Petroleum Hydrocarbons by 418.1 or other methods approved by the Executive Officer and 3) metals. **Plan Due No Later Than March 15, 1998.**

D. PROVISIONS

1. **Self Monitoring Program**: The discharger shall comply with the self monitoring program as attached to this Order and as may be amended by the Executive Officer.

2. **Cost Recovery**: The discharger shall be liable, pursuant to California Water Code Section 13304, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effect thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board - managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the discharger over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution

procedures for that program.

3. **Technical Reports:** Technical reports, submitted by the discharger, in compliance with the Prohibitions, Specifications, tasks and Provisions of this Order shall be submitted to the Board on the schedule specified herein. These reports shall consist of a letter report that includes the following:

   a. A summary of work completed since submittal of the previous report and work projected to be completed by the time of the next report;

   b. Identification of any obstacles which may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles;

   c. In the event of non-compliance with any Prohibition, Specification, Provision or Tasks of this Order, Exxon shall verbally notify the Board and if requested, follow up with a written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order and,

   d. All submittal of hydrogeological plans, specifications, reports, and documents (except quarterly progress and self-monitoring reports), shall be signed by and stamped with the seal of a registered geologist, registered engineering geologist, or registered professional civil engineer.

4. **Laboratory Qualifications:** All samples shall be analyzed by State certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control records for Board review. This provision does not apply to analyses that can reasonably be performed only on site (e.g temperature).

5. **Document Distribution:** Exxon shall notify the following agencies of all reports and other documents pertaining to compliance with this Order, submitted by Exxon, and shall provide a copy of the report to the agency if requested. A copy of the transmittal letter to each report may be used to satisfy this requirement provided that the letter indicates that the agency may obtain a copy of the report if they request it.

   a. City of Benicia, Planning Department;
   b. Solano County Health Department, and;

c. California EPA, DTSC.

6. **Access to Site and Records:** The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code, the following:

a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order;

b. Access to copy all records required to be kept under the terms and conditions of this Order;

c. Inspection of any monitoring equipment or methodology implemented in response to this Order; and,

d. Sampling of any ground water or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.

7. **Reporting of Changed Ownership or Operator:** The discharger shall file a report of change of ownership or occupancy associated with the property described in this Order following any changes in ownership or occupancy.

8. **Reporting of Hazardous Substance Release:** If hazardous material or designated waste is discharged in or on any waters of the state, or discharged and deposited in any place where it may be carried off to, or probably will be discharged in or on any waters of the state, Exxon shall file a verbal report of such discharge / incidents to the following:

a. This Regional Board at (510) 286-1255 on weekdays during office hours from 8 a.m. to 5 p.m.; and,

b. The Office of Emergency Services at (800) 852- 7500.

Upon requests by the Executive Officer, a written report shall be filed with the Regional Water Board within five working days and shall contain information relative to the nature of waste or pollutant, the quantity involved and the duration of incident, the cause of spill, the estimated size of affected area, the corrective measures implemented or planned, and a time schedule for implementation of these measures and, the persons/agencies notified. Hazardous materials or designated wastes include substances defined in Division 4.5, Title 22 and Chapter 15, Division 3,Title 23 of the California Code of Regulation (CCR). Reportable quantities are as defined in the CCR title 23, sections 2260, 2251 and 2250 and the California Water Quality Act

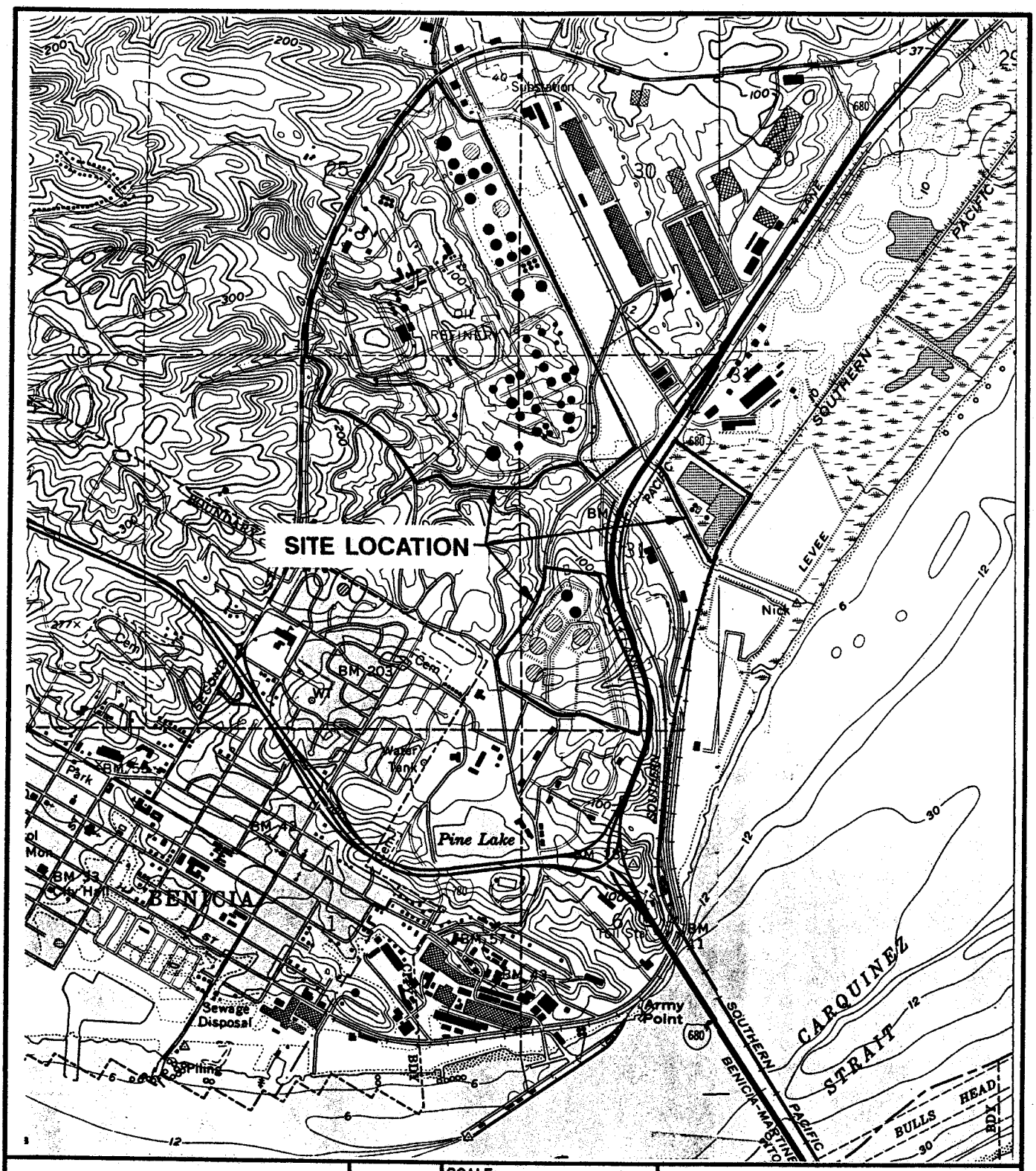
section 13272.

9. **Periodic SCR Review**: This Order is subject to Board review and updating, as necessary, to comply with changing state or Federal Laws, regulations, policies, or guidelines; changes in the Board's Basin plan; or changes in the discharge characteristics. The discharger may request for a revision of this order and upon review, the Executive Officer may recommend that the Board revise these requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on June 18, 1997.

Loretta K. Barsamian
Executive Officer

Attachments:
Figure 1: Site Location Map
Figure 2: Site Plan View (including area indications)
Figure 3: Area 1 (Waste Water Treatment Plant (WWTP))
Figure 4: Site Location Map (Indicating location of Area 13)
Figure 5: Area 13 (Map of Pipeline High Point)
Figure 6: Area 13 (Map of Old Dock Pipeline)
Figure 7: Area 4,5, & 7 (Upper Level Storage Area)
Figure 8: Area 8 (Lower Level Storage Area)
Self Monitoring Program
Table 1: References



GROUNDWATER TECHNOLOGY

4057 PORT CHICAGO HWY
CONCORD, CA 94520
(510) 671-2387

N

SCALE: 0 FEET 2000

SITE LOCATION MAP

CLIENT: EXXON REFINERY

DATE: 7/1/93

LOCATION: BENICIA, CALIFORNIA

FIGURE: 1

Area Designations For Groundwater Investigations

Area Number and Description

1 ..... Wastewater Treatment Plant

2 ..... Marketing Terminal

3 ..... Park Road Parcel
(Beaver Creek, Buffalo Wallow, and Wastewater Diversion Tanks)

4, 5, & 7 ..... Upper Storage Tank Area
(4 = South, 7 = North, 5 = East)

6 ..... Crude Oil Storage Tank Field

8 ..... Lower Storage Area

9 ..... Process Block

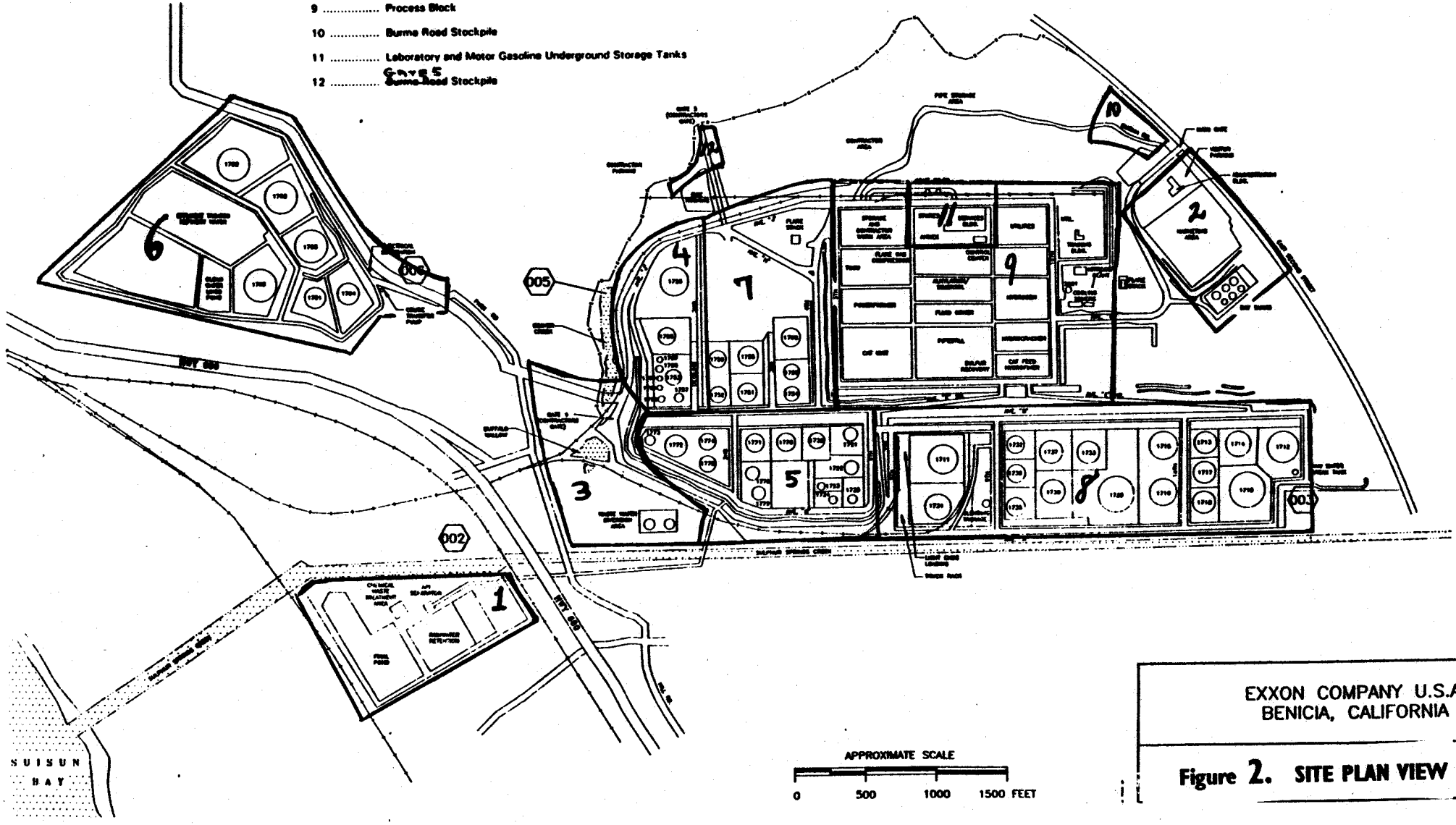
10 ..... Burma Road Stockpile

11 ..... Laboratory and Motor Gasoline Underground Storage Tanks

12 ..... Burma Road Stockpile

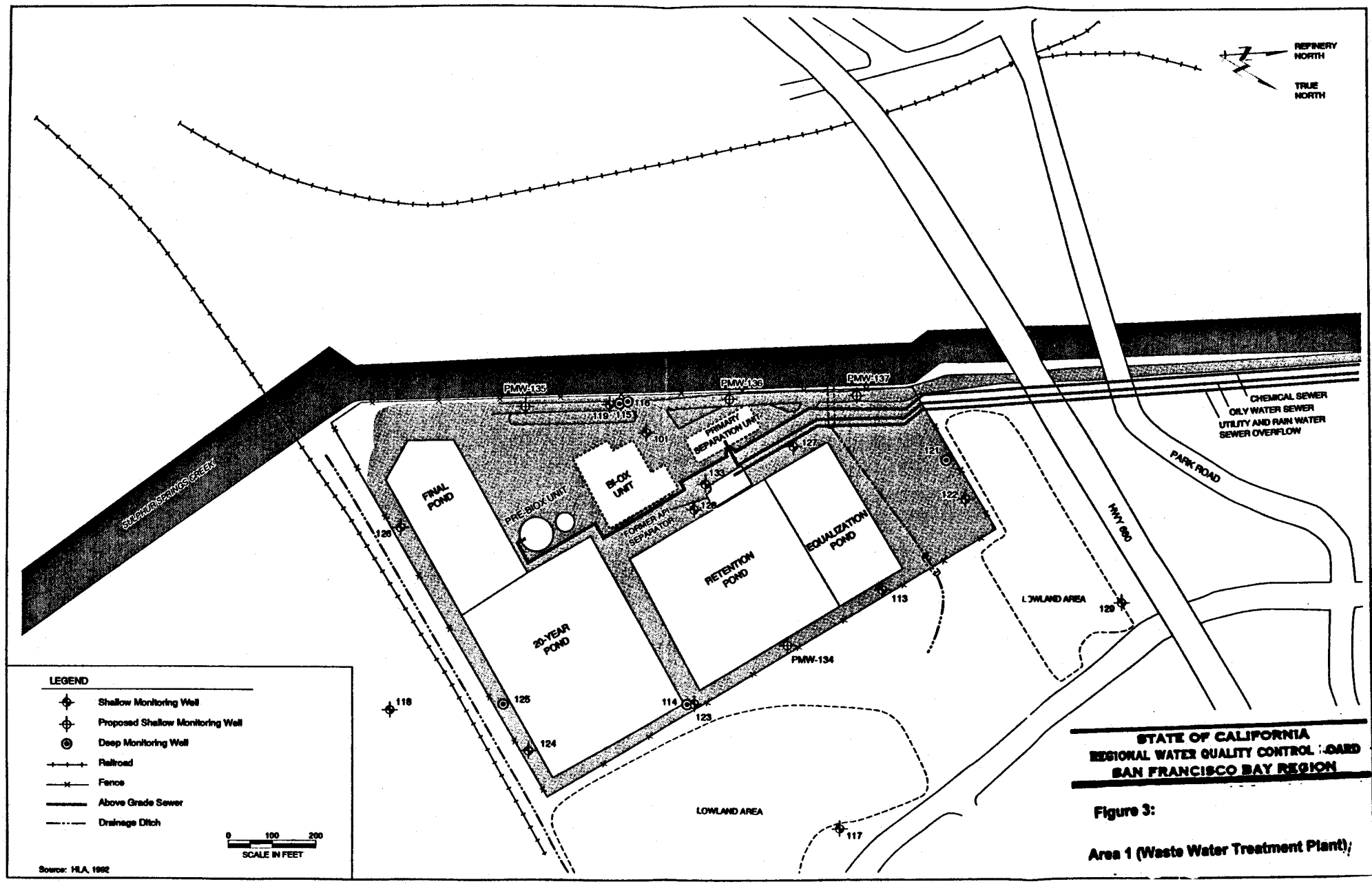
Refinery North

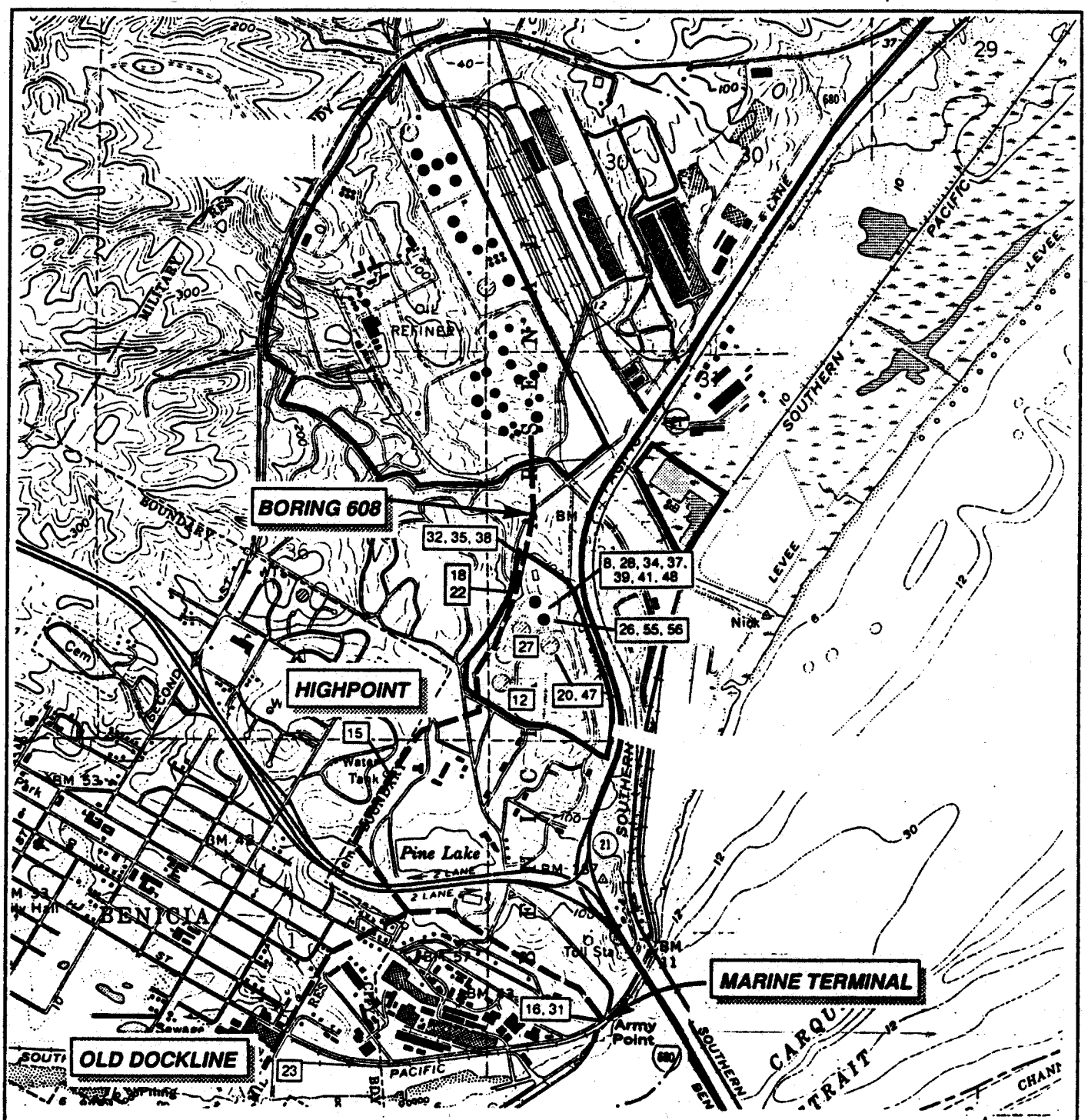
True North



EXXON COMPANY U.S.A.
BENICIA, CALIFORNIA

Figure 2. SITE PLAN VIEW


REFINERY NORTH
TRUE NORTH
PMW-135
PMW-136
PMW-137
116
119
115
101
PRIMARY SEPARATION UNIT
127
121
133
122
129
FINAL POND
PRE-BIOX UNIT
BI-OX UNIT
FORMER API SEPARATOR
128
RETENTION POND
EQUALIZATION POND
20-YEAR POND
113
PMW-134
125
114
123
124
116
117
LOWLAND AREA
LOWLAND AREA
129
CHEMICAL SEWER
OILY WATER SEWER
UTILITY AND RAIN WATER SEWER OVERFLOW
PARK ROAD
HWY 680
SULPHUR SPRINGS CREEK
LEGEND
Shallow Monitoring Well
Proposed Shallow Monitoring Well
Deep Monitoring Well
Railroad
Fence
Above Grade Sewer
Drainage Ditch
0
100
200
SCALE IN FEET
Source: HLA, 1992
STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
Figure 3:
Area 1 (Waste Water Treatment Plant)



NOTE : THE REFINERY COORDINATE SYSTEM IS BASED UPON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH (C.F. BRAUN & CO. OCT. 1966, DRAWING NO. 2922-133-CD-29).
REFERENCE: FROM THE FOLLOWING U. S. G. S. 7.5' TOPOGRAPHIC QUADRANGLES BENICIA AND VINE HILL, CALIFORNIA, DATED 1980 AND 1959, RESPECTIVELY.

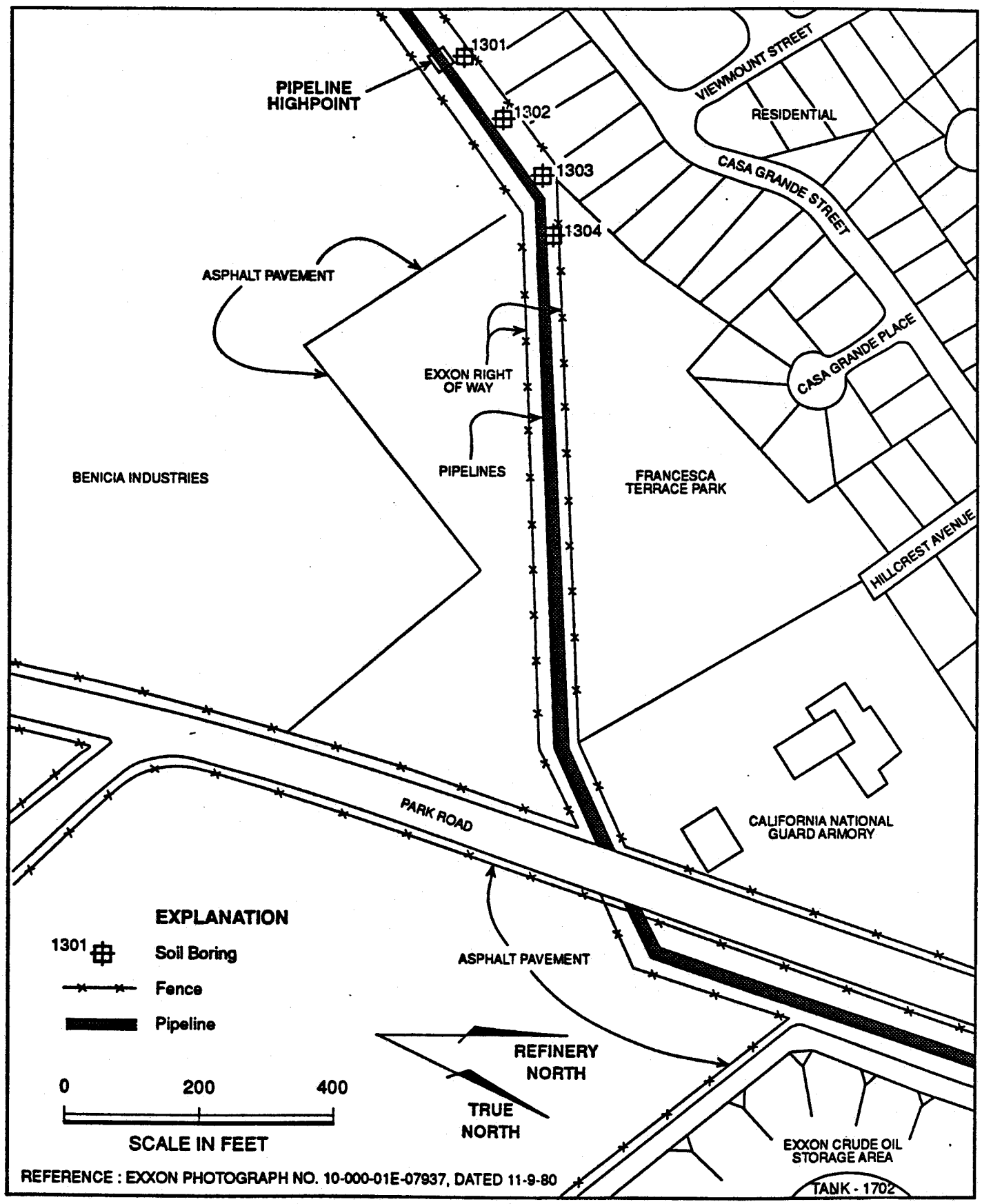
HLA

Harding Lawson Associates
Engineering and Environmental Services

Site Location Map of Area 13 (Highpoint & Old Dockline Pipeline)

FIGURE **4**

DRAWN	PROJECT NUMBER	DATE	REVISED DATE
RK	10512.502	12/29/92	



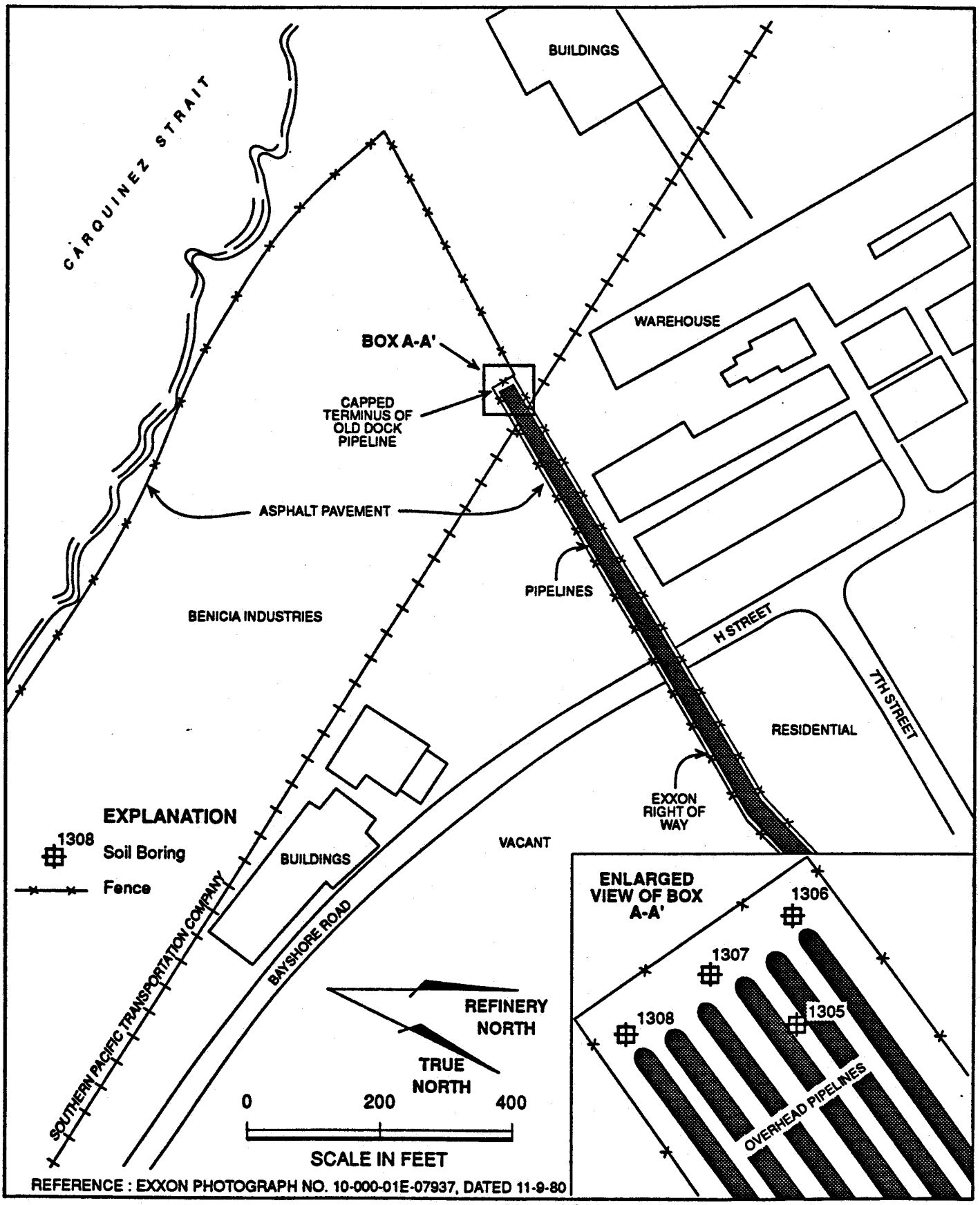
REFERENCE : EXXON PHOTOGRAPH NO. 10-000-01E-07937, DATED 11-9-80

Harding Lawson Associates
Engineering and Environmental Services

Map of Pipeline Highpoint
Assessment Report
Crude Oil Storage Area
Exxon Refinery
Benicia, California

FIGURE **5**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
RK	10512.502		2/23/93	



REFERENCE : EXXON PHOTOGRAPH NO. 10-000-01E-07937, DATED 11-9-80

Harding Lawson Associates
Engineering and Environmental Services

Map of Old Dock Pipeline
Assessment Report
Crude Oil Storage Area
Exxon Refinery
Benicia, California

FIGURE **6**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
RK	10512.502		2/23/93	

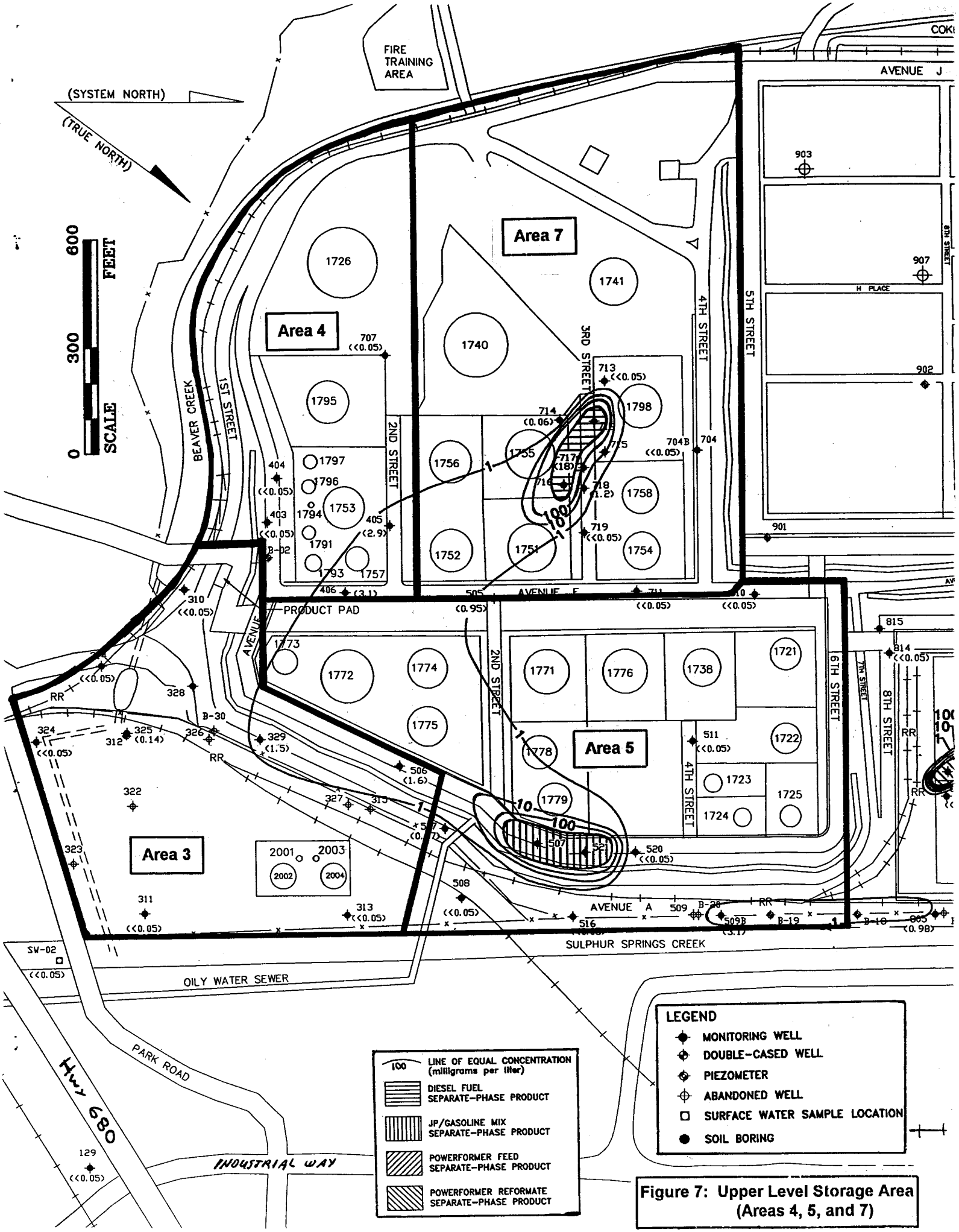
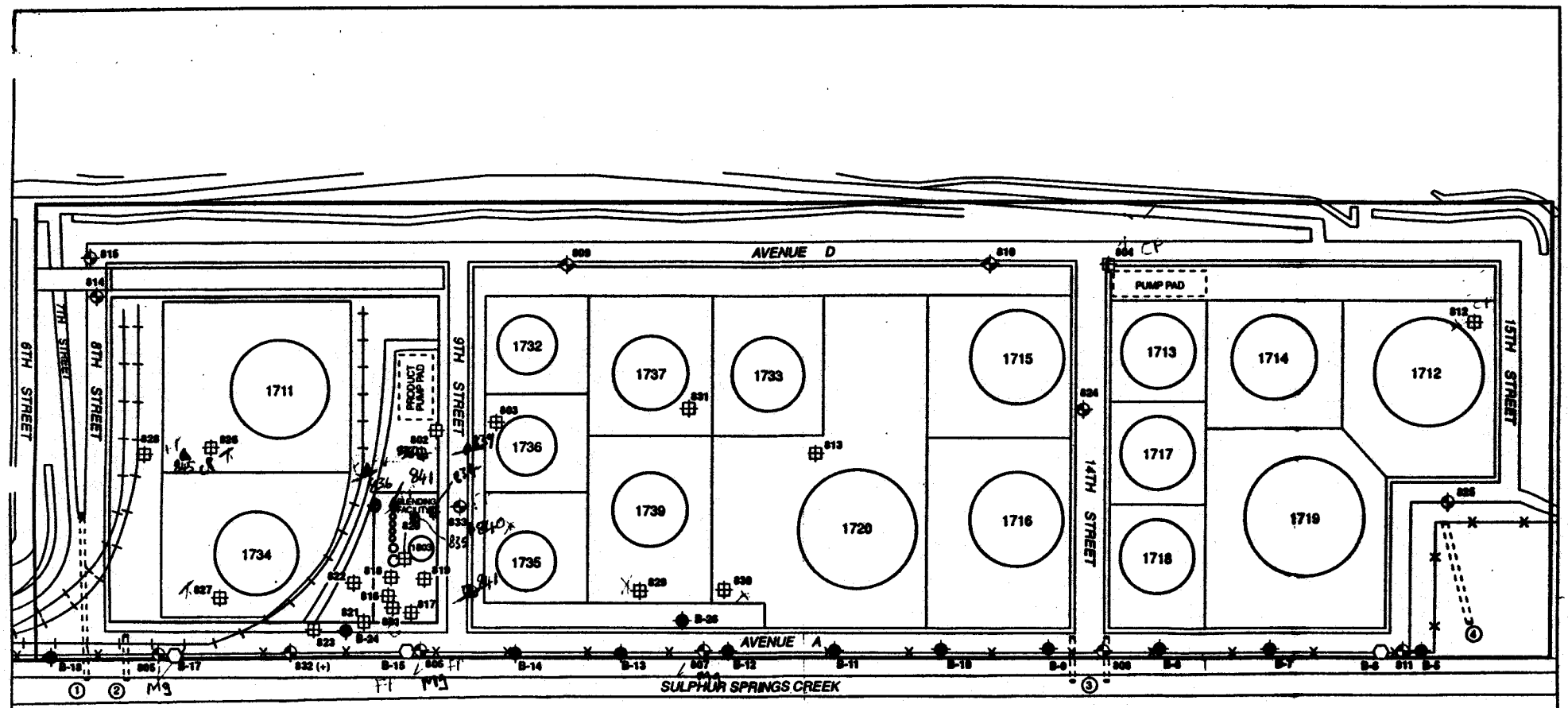


Figure 7: Upper Level Storage Area (Areas 4, 5, and 7)



NOTE :
(+) B-16 RECONSTRUCTED AS 832
THE REFINERY COORDINATE SYSTEM IS BASED UPON AN ASSUMED ORIENTATION. THE REFINERY NORTH IS APPROXIMATELY 35 DEGREES WEST OF TRUE NORTH (C.F. BRAUN & CO. OCT. 1966, DRAWING NO. 2922-133-CD-29).

Harding Lawson Associates
Engineering and Environmental Services

Site Map
Assessment Report
Lower Level Storage Area
Exxon Refinery
Benicia, California

FIGURE 8

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
RHC	10514.520		09/22/92	

REFERENCES

1. HLA ASSESSMENT REPORT - AREA 1: WASTEWATER TREATMENT PLANT, SEPTEMBER 30, 1992.

2. REPORT OF WASTE DISCHARGE: WASTEWATER TREATMENT PONDS AND CRUDE FIELD RETENTION POND, JUNE 8, 1988.

3. DRAFT REPORT: WASTEWATER TREATMENT POND CHARACTERIZATION, AUGUST 22, 1989.

4 HLA ASSESSMENT REPORT - AREA 6 / 13 : CRUDE OIL STORAGE AREA and High Point/ Old Dock Line Area, APRIL 29, 1993.

5 HLA ASSESSMENT REPORT - AREA 8: LOWER LEVEL STORAGE AREA, 9/ 30/ 92.

6 GTI FREE PHASE HYDROCARBON ASSESSMENT REPORT, JULY 21, 1994.

7 HLA ASSESSMENT REPORT - AREA 4, 5 & 7: UPPER LEVEL STORAGE AREA, 9 / 30 / 92.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

EXXON COMPANY U.S.A.

3400 East Second ST.,

BENICIA, SOLANO COUNTY

SITE CLEANUP REQUIREMENTS
ORDER NO. 97 - 077

1. **Authority and Purpose:** The Board requests the technical reports required in this Self - Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self - Monitoring Program pursuant to Water Code Sections 13267 and 13304 is intended to document compliance with Board Order No. 97 - 077 (Site Clean Requirements).

2. **Monitoring:** The discharger shall measure groundwater elevations quarterly in all monitoring wells or sumps, and shall collect and analyze representative samples of groundwater according to the specifications of paragraph 4 below (Observations and Test Procedures). The schedule of well observations and grab sampling shall be conducted quarterly within the months of January, April, July and October.

   The discharger shall sample any new monitoring or extraction wells quarterly and analyze groundwater samples for the same constituents according to the specifications of paragraph 4 below (Observations and Test Procedures). The discharger may propose changes to the self monitoring program; any proposed changes are subject to Executive Officer approval.

3. **Quarterly Monitoring Reports:** The discharger shall submit quarterly monitoring reports to the Board no later than 45 days following the end of the quarter. The first quarter self monitoring report shall be due on May 15th of each year. The report shall include but not limited to:

   a. Transmittal Letter: The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall be signed by the discharger's principal Executive Officer or his/her dully authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

   b. Groundwater Elevations: Groundwater elevation data shall be presented in tabular form, and a groundwater elevation map should be prepared for each monitored water bearing zone. Historical groundwater elevation shall be included in the fourth quarter report each year.

   c. Groundwater sampling data shall be presented in tabular form, and an iso-concentration map should be prepared for one or more key contaminants for each monitored water bearing zone, as appropriate. The report shall indicate the analytical method used, detection limits obtained for each reported constituent, and a summary QA / QC data. Historical groundwater sampling results shall be included in the fourth quarterly report each year. The report shall describe any significant increases in contaminant concentrations since data, such as lab data sheets, need not be included (however, see record keeping - below).

   d. Groundwater Extraction: If applicable, the report shall include groundwater extraction

results in tabular form, for each extraction well, trench or sump and for the site as a whole, expressed in gallon per minute and total groundwater volume for the quarter. The report shall include estimates of free phase and contaminants removed from groundwater extraction wells, trenches, sump and other remedial systems (e.g. soil vapor extraction), expressed in units of chemical mass per day and mass for the quarter. Historical mass removal results shall be in the fourth quarterly report each year.

e. Status Report: The quarterly report shall describe relevant work completed during the reporting period (e.g. site investigation, interim remedial measures) and work planned for the following quarter.

4. **Observations and Test Procedures**

a. The ground water well observations shall consist of the following:

i. Water elevation reported to the nearest 0.1 inch for both depth to water from the ground surface and the elevation of the ground water level;

ii. Ground water temperature measured at the time of sampling and reported in degrees Fahrenheit;

iii. Ground water electrical conductivity measured at the time of sampling as per Standard Methods 205 using potentiometric methodology;

iv. Ground water pH measured at the time of sampling as per Standard Methods 423 or EPA 150.1; and,

v. Ground water turbidity measured at the time of sampling Using EPA 180.1 or other approved field methods.

b. The test procedures for the ground water samples and soil samples if required shall be consist of the following:

i. Volatile aromatic compound analysis using the EPA Method 5030/8020;

ii. Semi Volatile organic compound analysis using the EPA Method 5030/8240;

iii. Total dissolved solids using EPA Method 160.1;

iv. Total Petroleum Hydrocarbons and Fuel Hydrocarbons using the EPA Method 5030/8015 (Modified);

v. Total Recoverable Petroleum Hydrocarbon using Standard Methods 418.1, infrared analysis or other methods acceptable to the Executive Officer. Use of this method shall be reviewed along with the intended SMP frequency modification;

vi. Metals using EPA approved methods and;

vii Alkalinity, ammonia and chloride content using EPA 310, EPA 350 and EPA 325 methods.

5. **Violation Reports:** In the event that Exxon violates or threatens to violate the conditions of the Site Cleanup Requirement. Exxon shall notify the Regional Water Board office by telephone as soon as Exxon or Exxon's agents have knowledge of the incident and shall confirm this notification in writing within 7 working days of the telephone notification if requested by the Executive Officer. The written report shall include time and date, duration and estimated volume of release, method used in estimating volume and person notified of the incident. The report shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps were taken to prevent the problem from recurring.

6. **Other Reports:** Unless the Executive Officer approves other requirement as part of Exxon's soil management plan, the discharger shall notify the Executive Officer in writing prior to any site activities (involving the movement of 15 yd^3 or more of soil), such as construction or underground tank removal, which have the potential to cause further migration of contaminants or which would provide new opportunities for site investigation.

7. **Record Keeping:** The discharger or his/her agent shall retain data generated for the above reports, including lab results and QA/ QC data, for a minimum of six years after origination and shall make them available to the Board upon request.

8. **SMP Revisions:** Revisions to the Self Monitoring Program may be ordered by the Executive Officer, either on his / her own initiative or at the request of the discharger. Prior to making SMP revisions, the Executive Officer will consider the burden including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.

I, Loretta K. Barsamian, Executive Officer, hereby certify that the foregoing Self-Monitoring Program is as follows:

1. Developed in accordance with the procedures set forth in this Board's Resolution No. 73-16;

2. Adopted by the Board and Effective on the date shown below; and,

3. May be reviewed or modified at any time subsequent to the effective date, upon written notice from the Executive Officer, or request from the discharger.

June 18, 1997
Date Ordered

Loretta K. Barsamian
Executive Officer